

In The  
**United States Court Of Appeals  
For The Fourth Circuit**

**BARRY ZUCKERMAN; ARLENE ZUCKERMAN,**  
*Plaintiffs – Appellants,*

v.

**WAL-MART STORES EAST, L.P.;**  
**WAL-MART STORES, INC.; LOUISVILLE LADDER, INC,**  
*Defendants – Appellees,*

and

**DAVIDSON MANUFACTURING CORP LLC; DAVIDSON LADDERS NEVADA INC,**  
*Defendants.*

**ON APPEAL FROM THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF SOUTH CAROLINA  
AT BEAUFORT**

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**BRIEF OF APPELLANTS**

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UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT  
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## **JURISDICTIONAL STATEMENT**

Appellees invoked the District Court's subject matter jurisdiction by removing this case pursuant to 28 U.S.C. § 1332 on the basis of complete diversity of citizenship. This Court has jurisdiction pursuant to 28 U.S.C. § 1291. The District Court entered final judgment by denying Appellants' motion for reconsideration and granting Appellees' motion for summary judgment on December 12, 2014. Appellants timely filed a Notice of Appeal on January 8, 2015.

## **STATEMENT OF THE ISSUES**

- I. WHETHER THE DISTRICT COURT ERRED IN EXCLUDING DR. KELKAR'S EXPERT TESTIMONY BASED ON AN INCORRECT RELIABILITY STANDARD THAT AN EXPERT EXCLUDE ALL ALTERNATIVE CAUSES WITH CERTAINTY?**
- II. WHETHER THE DISTRICT COURT ERRED IN GRANTING SUMMARY JUDGMENT TO APPELLEES AS TO ALL CAUSES OF ACTION BASED SOLELY ON THE EXCLUSION OF DR. KELKAR'S EXPERT TESTIMONY?**

## **STATEMENT OF THE CASE**

This is a product liability action in which Appellant Barry Zuckerman alleges that a ladder manufactured by Appellee Louisville Ladder and sold by Appellee Wal-Mart Stores (collectively "Appellees") structurally failed on November 5, 2011, and caused him to fall and sustain injuries. Shortly before trial, the District Court granted Appellees' Motion to Exclude Appellants' expert, Dr.

Ajit D. Kelkar, and, consequently, granted Appellees' Motion for Summary Judgment in the absence of Dr. Kelkar's expert testimony. Appellants challenge both rulings.

### **Statement of Facts**

Mr. Zuckerman purchased the ladder at issue in late 2009 at a Wal-Mart store in Hardeeville, South Carolina. (JA 15, 96). He bought the ladder for two normal uses—to change air filters and smoke detector batteries in his home. (JA 99). The ladder is six feet tall and made of aluminum alloy. (JA 25, 114). It was manufactured in Mexico and has a 225 pound load capacity. (JA 114, 29). When purchasing the ladder at issue, Mr. Zuckerman relied on the ladder standards stated on the label. (JA 98-99).

Over the next two years, Mr. Zuckerman used the ladder approximately eleven times per year and never experienced a problem with the ladder prior to the incident at issue. (JA 100, 104-05). At the time of the accident, the ladder was in essentially the same condition as when Mr. Zuckerman purchased it. He stored the ladder in his garage and testified the ladder was not abused. (JA 116, 171).

On November 5, 2011, Mr. Zuckerman used the ladder to change the batteries in a smoke detector in his home. (JA 16). The smoke detector is located in the entry hallway. (JA 101). Mr. Zuckerman set up the ladder so the top of it was “a little bit past” the smoke detector. (JA 103-04, ln. 4). He “pulled the ladder

apart so that [he] made sure the ladder wasn't wobbly," and straightened the spreaders. (JA 104 lns. 19-23). Mr. Zuckerman, wearing tennis shoes, climbed to the third step of the ladder. (JA 102). He is about 5 feet, 10 ½ inches tall. (JA 97).

While Mr. Zuckerman was reaching up to the smoke detector, the side of the ladder caved or folded in, and he fell backwards to the floor. (JA 107). He testified the ladder "went like an accordion, went forwards" and he fell backwards onto his back and neck. (JA 101, 107 lns. 6-13). Mr. Zuckerman said the ladder "fold[ed] in on the sides. And I could not hold onto the ladder. The only way I could go was backwards." (JA 107 lns. 18-20). Mr. Zuckerman weighed less than 200 pounds at the time of the fall, well within the advertised 225-pound load capacity of the ladder. (ECF 77-1 p. 105).

Mr. Zuckerman was home alone when the ladder buckled and caused him to fall. (JA 109). He "got ice and put ice on my foot and my neck and my back" to alleviate the immediate pain. (JA 109 lns. 16-20). He called his wife, Appellant Arlene Zuckerman, who was out of town at the time. (JA 109). As a result of the accident, Mr. Zuckerman needed a Transcutaneous Electrical Nerve Simulation ("TENS") unit for pain management and surgery. (JA 110). He used the TENS twice a day. (JA 110). Mr. Zuckerman worked as a teacher at Coastal Harbor Treatment Center in Savannah, Georgia. (JA 241). He attempted to return to work after the incident but, due to severe back pain, he eventually retired. (JA 242).

Appellants filed this action in state court in Jasper County, South Carolina, on July 13, 2012, alleging product liability causes of action for negligence, strict liability, breach of the implied warranty of merchantability, breach of the implied warranty of fitness for a particular purpose, and loss of consortium for Mrs. Zuckerman. (JA 14-24). Appellees removed the action to federal court on August 24, 2012, based on diversity jurisdiction pursuant to 28 U.S.C. § 1332. (JA 11-12).

Appellants identified Dr. Ajit D. Kelkar and Dr. Evan Kimbro as expert witnesses. (JA 56). Dr. Kelkar is the expert whose testimony the District Court excluded, resulting in the instant appeal. His education, experience, and training are discussed below, followed by a description of his investigation and conclusions in this case, and a discussion of his testimony in a prior, similar case against Louisville Ladder affirmed by this Court. *Pugh v. Louisville Ladder, Inc.*, 361 Fed. Appx. 448 (4th Cir. 2010).

#### **I. Dr. Kelkar's Education, Experience, and Training**

Dr. Kelkar is a Professor and Chairman of the Joint School of Nanoscience and Nanoengineering at North Carolina A&T State University. (JA 56, 147). Nanoengineering is “engineering related to materials which are microscopic.” (JA 148 Ins. 4-7, 20-21). Dr. Kelkar obtained a bachelor of science degree in engineering in India, and a master of science degree in engineering and Ph.D. in mechanical engineering in the United States. (JA 58). His Ph.D. is “devoted

entirely to fracture mechanics, particularly in the area of failures due to fractures that can be caused by impact.” *Pugh*, 361 Fed. Appx. at 455 n.7.

Prior to serving as the Chairman of Nanoscience and Nanoengineering, Dr. Kelkar served as Chairman of Computation of Science and Engineering at North Carolina A&T. (JA 149). He started one of the first of these programs “related to modeling and simulations of” biological, chemical, and physical areas, involving mechanical, electrical, and civil engineering. (JA 149 lns. 14-24).

Dr. Kelkar worked for NASA conducting research on “*fracture of metals*, composites, different kind of materials, *why they fail*.” (JA 151 lns. 4-6) (emphasis added). Dr. Kelkar worked for

the Air Force, Army, and Navy, and authored over 200 publications. He has also worked on several rivet studies and is an engineer for a school bus company for which he helped develop a new design aimed at *eliminating cracks in manufacturing due to the riveting process*.

*Pugh*, 361 Fed. Appx. at 455 n.7 (emphasis added). Dr. Kelkar also worked as a quality control engineer for Mercedes Benz, where his “responsibility was to look for all the components, *whether they have any failure defects, any cracks*.” (JA 152 lns. 6-15) (emphasis added). He has “25 years of engineering experience in the area of impact, fatigue, and tensile, compressive failure of various materials including catastrophic failure of structures like ladders.” (JA 26). He participated in over 80 funded research proposals, including ones entitled “Effect of Temperature on Fatigue Behavior of *Riveted Joints* and Adhesively Bonded

Joints” and “Fracture Toughness Studies of High Strength Materials.” (JA 61-63) (emphasis added). Dr. Kelkar also co-authored two engineering books. (JA 63-66).

## **II. Dr. Kelkar’s Expert Report, Testing, and Deposition Testimony**

The District Court, in reaching its decision to exclude Dr. Kelkar, considered, among other things, Drs. Kelkar and Kimbro’s Failure Analysis report, Dr. Kelkar’s deposition testimony and affidavit, and this Court’s opinion in *Pugh*. The Court did not conduct a separate *Daubert*<sup>1</sup> hearing.

Drs. Kelkar and Kimbro wrote a “Failure Analysis of Louisville Ladder” report that details the methods and conclusions of their engineering investigation to determine the likely cause of the ladder’s failure. (JA 28-55). Dr. Kelkar began with a visual examination of the deformed ladder that evidenced “obvious visible cracks around the rivets for steps 1, 2,” the location where the ladder buckled. (JA 33, 38). The photos below from Dr. Kelkar’s report show where the ladder buckled between steps 1 and 2. The rivet holes connect the side rails to the steps. The failure of the rivet hole at step 2 on the right side is visible in both photos.

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<sup>1</sup> *Daubert v. Merrell Dow Pharms.*, 509 U.S. 579 (1993).



JA 30, Fig. 3

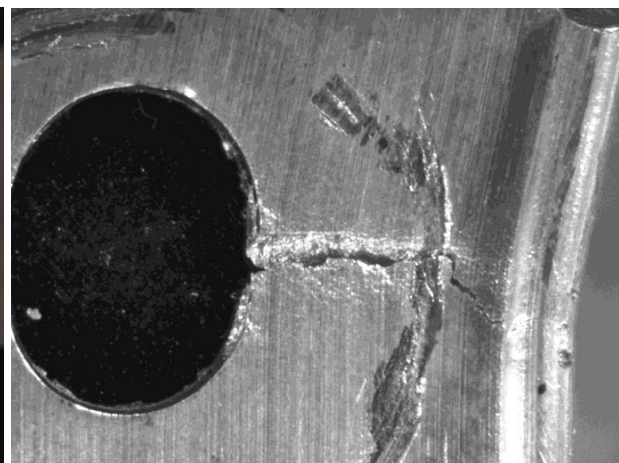


JA 30, Fig. 4

After the visual examination, Dr. Kimbro conducted destructive testing in which he cut samples of parts of the ladder around the rivet holes and Drs. Kelkar and Kimbro observed the samples “under the scanning electron microscope and t[ook] pictures at higher magnifications.” (JA 175-76). Appellees’ expert was present for the destructive testing. (JA 31). Upon “microscopic examination” Dr. Kelkar found “micro cracks” at the rivet holes at step 3. (JA 33, 38, 42-43). The photos below from Dr. Kelkar’s report show where the side rail buckled at the rivet hole around step 2 and a microscopic image of the micro cracks around the rivet hole of step 1.



JA 31, Fig. 5



JA 39, Fig. 9

After evaluating the facts of the incident given by Mr. Zuckerman and conducting the initial, visual and microscopic investigations of the ladder, Dr. Kelkar formed the following hypotheses as to the cause of the ladder's failure:

- (1) The stepladder buckled under the load imposed by [Zuckerman]'s weight;
- (2) An impact to the stepladder, such as [Zuckerman]'s body striking the ladder in a fall or some other impact of unidentified origin; or
- (3) The placement of the rivet holes in the aluminum during manufacture of the stepladder induced cracks around the rivet holes, which propagated and, ultimately, reduced the moment of inertia in the side rails that caused them to buckle.

(JA 32-33). Appellees' expert's theory in this case is the second hypothesis listed above. (JA 205-06). Dr. Kelkar explained in his report and deposition how and why he ruled out all hypotheses except for the third—that microcracks formed around the rivet holes at the time of manufacture and propagated over time until the ladder buckled on November 5, 2011, resulting in Mr. Zuckerman's fall and injuries. No other hypotheses have been suggested.



***A. Dr. Kelkar Ruled Out Mr. Zuckerman's Weight, a Design Flaw, Corrosion, and Flawed Materials***

Dr. Kelkar first ruled out Mr. Zuckerman's weight as a cause of the ladder failure. He concluded Mr. Zuckerman's weight (less than the 225-pound advertised load capacity) did not cause the ladder failure because, upon measuring the ladder dimensions, he found the "rail dimensions were in agreement with the drawings provided" and the ladder's actual load capacity exceeded the maximum rated load. (JA 34). These measurements also ruled out a design flaw in the ladder that would cause it to buckle at less than the advertised load capacity. (JA 34, 316-17).

Dr. Kelkar ruled out corrosion or other damage to the ladder as a cause of the buckling failure. He visually inspected the ladder and, finding no "sign of corrosion, pitting, surface scratches, etc.", he ruled out "use of flawed materials" as a basis for the ladder buckling under Mr. Zuckerman's weight. (JA 34). Dr. Kelkar testified "[u]sually if there's corrosion, you will see pitting or kind of small, small, tiny surface roughness. I didn't see anything." (JA 186 lns. 7-10). When asked if he could "absolutely rule out corrosion", Dr. Kelkar confirmed, "[v]isibly, I could see that there is no corrosion. . . . We didn't know whether the corrosion would

have existed until we did the destructive testing. We didn't see any corrosion.” (JA 186 lns. 11-20).<sup>2</sup>

***B. Dr. Kelkar Ruled Out Impact Damage***

Dr. Kelkar next ruled out impact damage. He found that “deformation by an impact was not a reasonable conclusion” because, based on “application of engineering analysis” and his personal experience, knowledge, and education, “the Zuckerman Louisville Ladder did not have the typical appearance of impact damage.” (JA 36-37). Dr. Kelkar inspected the ladder for impact dents but found none. (JA 157). This corresponds with Mr. Zuckerman’s testimony that he did not fall on the ladder. (JA 107). Dr. Kelkar explained, based on his “own experience,” “impact dents are entirely different than the buckling failures.” (JA 155-56).

When Appellees’ counsel pressed Dr. Kelkar about his knowledge regarding what impact damage looks like, he referenced the impact damage tests he conducted in *Pugh*. Dr. Kelkar explained that, when he investigated the cause of the ladder failure in *Pugh*, he specifically tested for impact damage. “[W]e did create 200-pound dummies and impacted it from several different heights on the Louisville Ladders.” (JA 159 lns. 5-12). He dropped the dummies from “different

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<sup>2</sup> Dr. Kelkar also ruled out material hardness as causing the ladder failure. “Hardness has nothing to do with buckling.” (JA 188 lns. 7-8). “The buckling formula will tell you the hardness is not coming into the picture.” (JA 188 lns. 19-20).

heights onto the ladder.” (JA 159 Ins. 15-17). The dummies “were specifically designed to replicate the human.” (JA 160 Ins. 3-4).

Dr. Kelkar testified definitively that the microcracks were not caused by “impact damage.” (JA 121 Ins. 9-15). His personal knowledge and experience that “the way in which the failure looks currently is a classic buckling failure and not impact failure” led him to “completely” rule out impact damage. (JA 158 Ins. 19-25, 179 Ins. 16-25). “It is not impact damage.” (JA 190 ln. 15).

***C. Dr. Kelkar Determined Microcracks Formed at the Time of Manufacture and Caused the Ladder Failure***

Finally, Dr. Kelkar concluded the microcracks around the ladder rivet holes formed at the time of manufacture and propagated over time until “the critical load was reached,” and caused the ladder to buckle and collapse. (JA 34-36). Drs. Kelkar and Kimbro conducted destructive testing and applied accepted engineering methods to reach this conclusion. Having seen visible cracks at the rivets, Drs. Kelkar and Kimbro removed rivets from the ladder at steps one, two and three, and examined them “under a scanning electron microscope.” (JA 35, 38). The microscopic examination showed “crack nucleation and initiation around” the rivet holes at all three steps.<sup>3</sup> (JA 35, 38).

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<sup>3</sup> See the photos at figures 8-26 of the report, which contain the microscopic images of the cracks. (JA 38-52).

Dr. Kelkar saw the microcracks at steps one and two without the aid of a microscope but saw the microcracks at step three only after viewing the rivet hole under the microscope. (JA 38). Due to the fact that the cracks at step three (above where the ladder buckled) “were originally hidden under the rivet heads and impossible to see without the aid of substantial magnification,” Dr. Kelkar concluded “that the ladder under investigation had pre-existing cracks around the rivet holes.” (JA 38).

In his opinion, the cracks formed when the rivet holes were punched into the side rails and existed at the time of manufacture. “The process of punching holes and inserting rivets in an aluminum part, by concentrating stress, has the potential of creating cracks in the aluminum where the holes are punched.” (JA 34, 38). Therefore, Dr. Kelkar “concluded that it was most likely that some initial cracks formed around the rivet holes at the time of manufacture and that the stresses imposed by standing on the ladder led to crack enhancement and propagation.” (JA 35). This Court stated in *Pugh* that “based on his years of experience working with NASA, numerous branches of the military, and several private companies, [Dr. Kelkar] knows that punching a hole in any metal in order to install a rivet weakens the metal and that crack propagation from rivets in metals is a widely accepted phenomenon.” 361 Fed. Appx. at 452 n.2.

Dr. Kelkar explained how microcracks will grow over time to eventually result in a failure such as the one Mr. Zuckerman suffered.

When [a] ladder is used, if there are any defects, inherent defects like microcracks, every time you use the ladder, these cracks are subjected to stresses. And these cracks can grow every time you climb on the ladder if the microcrack exist.

(JA 132 lns. 4-10). He further testified “an aluminum alloy crack will propagate.”

(JA 120 lns. 15-17). “There are more than 10,000 papers” which state that accepted engineering principle. (JA 120 ln. 17).

Even after finding visible and microcracks on the ladder at issue and concluding the pre-existing cracks are the most likely cause of the ladder failure, Dr. Kelkar continued to test his theory using engineering software called “ANSYS”,<sup>4</sup> which he described as “standard structural mechanics finite element software.” (JA 35). Dr. Kelkar used the software to make “moment-of-inertia calculations.” (JA 35). The calculation tested C-shaped sections of the ladder with and without cracks.<sup>5</sup> (JA 35). Using these calculations, Dr. Kelkar “determined

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<sup>4</sup> See <http://www.ansys.com/> (“ANSYS simulation software enables organizations to confidently predict how their products will operate in the real world.”).

<sup>5</sup> At the hearing on the Motion to Exclude Dr. Kelkar’s testimony, Appellees incorrectly argued that Dr. Kelkar did not conduct the C-shaped section test in this case. (JA 301-302). Appellees argued the presence of that test in the *Pugh* case and alleged absence of it in this case supported the argument that Dr. Kelkar did not conduct sufficient testing. To the extent the District Court relied on this representation, such reliance is misplaced because Dr. Kelkar did in fact conduct C-shaped section testing in this case.

that the cracks observed in . . . the side rail of the stepladder would result in significant reduction of the moment of inertia.” (JA 36). This would, in turn, “reduce the critical value of the buckling load below the rated load-carrying capacity of the ladder stated on the label.” (JA 36). Therefore, in Dr. Kelkar’s opinion, “the Zuckerman Louisville Ladder most likely failed in the manner described by Barry Zuckerman, a sudden failure by buckling caused by cracks around the rivet holes in the stepladder that occurred at loads below the rated load-carrying capacity of the step ladder as represented on the label.” (JA 37).

Dr. Kelkar based his calculations on “buckling formulas” that involve “modules of elasticity” and “the moment of inertia.” (JA 182 lns. 9-13, 183 lns. 5-7). The “moment of inertia is directly proportional to the buckling load. So if – [in] other words, if moment of inertia decreases, the buckling load, . . . the load at which the section can buckle, reduces.” (JA 183 lns. 9-14). In this case, the propagated cracks gave Dr. Kelkar a “clear-cut indication that the moment of inertia has substantially reduced.” (JA 183 lns. 19-22). He then “investigated all the parameters” and “concluded that the member which was cracked eventually has a substantially lower buckling load, and then it failed.” (JA 184 lns. 7-11).

Dr. Kelkar acknowledged it is not possible to date the microcracks and that he could not absolutely rule out the accident as a cause of the microcracks. (JA 143, 190). However, based on his education, knowledge, experience in fracture

mechanics and structures, training, testing, measurements, microscopic examination, and engineering calculations, Dr. Kelkar eliminated all other plausible causes, including the accident, as the most likely cause of the microcracks and ladder failure. Therefore, he testified that, in his opinion, “the more logical, reasonable and more likely explanation of the failure” is the formation of microcracks at the time of manufacture rather than impact damage to the ladder at the time of the accident. (JA 201 lns. 16-23).

**III. Dr. Kelkar’s Expert Testimony in *Pugh v. Louisville Ladder, Inc.*, 361 Fed. Appx. 448 (4th Cir. 2010)**

In *Pugh*, this Court affirmed the District Court’s decision to admit Dr. Kelkar’s expert testimony at trial. 361 Fed. Appx. at 449. The general facts, ladder failure theories, and expert investigation and testing are the same in *Pugh* and this case. *Pugh* purchased a Louisville Ladder manufactured in Mexico with a 225-pound load capacity. *Id.* at 449. The *Pugh* ladder is eight-feet tall and bears a different model number than the ladder in this case. *Id.* Appellants do not contend the ladders are the same but rather that the investigation and testing done by Dr. Kelkar in that case is the same as that conducted in this case such that the similarities support the reliability, methodology, and, ultimately, the admission of his expert testimony.

*Pugh* stored the ladder in his garage and used it for the first time on the day of the accident. *Id.* On the third time *Pugh* climbed the ladder that day, he fell and

recalled only “realizing that he was lying on the ground.” *Id.* at 450. The ladder showed damage between the first and second steps, and the second and third steps. *Id.* “There were also visible cracks around and through the rivets connecting the first three steps to the side rail.” *Id.* Dr. Kelkar conducted destructive testing and found microcracks “at locations throughout the ladder.” *Id.*

The competing theories as to the ladder failure were the same in *Pugh* as in this case.

Pugh’s theory was that his ladder had a manufacturing defect consisting of microscopic cracks at the ladder’s rivets and that, during normal use, such cracks propagated into larger cracks causing catastrophic failure/buckling that resulted in Pugh’s fall. In contrast, LL’s theory was that the ladder was not defective and did not fail, but that Pugh tipped the ladder during use and the ladder’s post-accident severely damaged condition was caused during the accident when Pugh’s body fell onto the ladder.

*Id.* at 450.<sup>6</sup> As in this case, “LL conceded that Dr[[]]. Kelkar . . . had the education and expertise to testify on the subject at issue but challenged the reliability of [his] opinions.” *Id.* This Court rejected Louisville Ladder’s challenge to Dr. Kelkar, holding the District Court did not err in admitting his expert “opinions to the jury where the weight of such opinions would be tested though vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof.” *Id.* at 456 (internal quotation marks omitted).

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<sup>6</sup> See JA 206 for Appellees’ expert’s opinion that Mr. Zuckerman’s body impacted the ladder to cause the damage.



In reaching its decision, this Court analyzed Dr. Kelkar's investigation and testing. It found that, in addition to the visual inspection, Dr. Kelkar performed further tests that supported his conclusions, including:

(1) testing to rule out a design defect; (2) "non-destructive" testing, including labeling, measuring, and photographing the accident ladder; (3) destructive testing, whereby samples were cut from the ladder's side rails and submitted for testing to a third-party facility; (4) fractographic examination of the side rails and rivets using a high magnification optical microscope and a scanning electron microscope; (5) using "standard engineering formulas" to determine that fully propagated cracks would have resulted in a substantial reduction of the "moment of inertia" of the side rails, which would in turn decrease the rails' load capacity; and (6) testing C-shaped sections of aluminum designed to mimic the accident ladder's side rails whereby mock rivet holes were drilled, cracks simulated, and the reduced load capacity tested - such testing was videotaped which permitted peer review.

*Id.* at 455. In addition to the testing listed above, Dr. Kelkar performed testing to disprove impact damage. This consisted of the use of a human dummy to test impact damage that Dr. Kelkar discussed in his deposition testimony in this case.

*Id.* at 455-56.

In challenging the admission of Dr. Kelkar's opinions, Louisville Ladder alleged deficiencies with [Dr. Kelkar's] conclusions, including the experts' failure to investigate the manufacturing process, failure to analyze the likelihood that micro-cracks would propagate based on aluminum's physical properties, failure to perform computer modeling, failure to definitively establish whether the micro-cracks pre-dated the accident, and failure to advance direct proof that micro-cracks occurred during manufacturing.

*Id.* at 456. This Court rejected these arguments. It held:

in light of the testing that was performed to both support [Dr. Kelkar]'s hypothesis and discredit LL's hypothesis, and the lack of evidence suggesting that any of such testing was unreliable, the alleged failure of Pugh's experts to perform additional testing goes more to the weight of the expert testimony than to its *Daubert* admissibility.

*Id.* at 456. This analysis is equally applicable in the Zuckermans' case because Dr. Kelkar conducted similar testing and, with his extensive experience and knowledge, reliably supported his hypothesis and discredited Appellees' impact damage hypothesis.

#### **IV. The District Court's Decision to Exclude Dr. Kelkar's Expert Testimony and Grant Summary Judgment for Appellees**

On August 15, 2014, Appellees filed a motion for summary judgment as to all of Appellants' causes of action and a Motion in Limine to Exclude Plaintiffs' Expert Dr. Ajit D. Kelkar. (ECF 69-70). Appellees argued in the Motion for Summary Judgment that the Zuckermans could not prove the microcracks existed at the time of manufacture. (ECF 69 pp. 4-6). Appellees did not dispute Dr. Kelkar's qualifications but, rather, alleged "the methods by which he reached his conclusions are inadequate, incomplete and unreliable." (JA 306 Ins. 10-15; ECF 70). Appellees made two arguments to exclude Dr. Kelkar's testimony: (1) he "did not adequately test alternatives to his theory that the ladder failed due to buckling caused by microcracks," and (2) his "conclusions that any microcracks in the

ladder were present at the time of manufacture is insufficiently supported to be submitted to a jury.” (ECF 70 pp. 4, 7).

For the argument regarding the presence of the microcracks at the time of manufacture, Appellees relied heavily on one question and answer from Dr. Kelkar’s deposition. (ECF 70).

Q. And therefore, you assume that those rivet hole – that those microcracks would have occurred at the time of manufacture. Is that it in a nutshell? Do I understand your – your opinion?

A. Yes.

(JA 138-39). Appellants maintained that, viewing Dr. Kelkar’s testimony and opinions as a whole, this question and answer do not affect the reliability of his opinion that the microcracks formed at the time of manufacture based on the elimination of other causes, destructive testing, microscopic examination and scientific calculations. (ECF 79).

The District Court held a hearing on the Motion to Exclude on September 15, 2014, and issued an oral ruling granting the Motion. (JA 295, 352). The Court acknowledged “There is no question about his qualifications.” (JA 314 lns. 12-13). Appellees did not dispute that Dr. Kelkar ruled out alternatives causes of the microcracks. (JA 331 lns. 3-7). Rather, they took exception with the fact that he did not conduct “more finite tests to” confirm that alternatives did not cause the ladder to fail. (JA 331 lns. 8-12).

The Court granted the Motion to Exclude based on Dr. Kelkar's acknowledgement that he could not definitively rule out that the microcracks occurred as a result of the accident. (JA 351). The Court stated "I just don't believe that he's got the correct data or sufficient data to form the opinion . . . that it happened at the time if left the manufacturer." (JA 351 lns. 20-23). The Court did not issue a formal written order. It allowed the parties to brief the issue of whether the Zuckermans' case could survive summary judgment without Dr. Kelkar's expert testimony. (JA 356-57).

On September 30, 2014, Appellants filed a Memorandum as to the summary judgment issue and a Motion to Reconsider, Alter, or Amend Order excluding Dr. Kelkar's testimony. (ECF 94-95). In the Motion to Reconsider, Appellants argued Dr. Kelkar's expert report and deposition testimony, when "viewed as a whole," demonstrate the reliability of his opinion that the most probable origin of the microcracks is at the time of manufacture and the opinion is sufficiently based on facts and data. (ECF 95 p. 3). The facts and data include Dr. Kelkar's elimination of other causes for the microcracks besides the manufacturing process, the presence of microcracks under the rivet heads and at rivet holes other than the one that failed, and the scientifically-based conclusion that the ladder exhibited buckling rather than impact damage. (ECF 95 pp. 3-5). Further, Appellants asserted there is no requirement for an expert "to eliminate with 100% certainty

every other alternative cause of failure,” but rather to determine based on reliable methods and facts the most probable or likely cause of the microcracks and ladder failure. (ECF 95 p. 11). Appellants requested that, at a minimum, the Court alter its ruling to exclude only portions of Dr. Kelkar’s testimony.<sup>7</sup> (ECF 95).

In the Memorandum regarding summary judgment, Appellants argued they could survive summary judgment without Dr. Kelkar’s testimony because Dr. Kimbro could testify as to the destructive testing and existence of microcracks, and Mr. Zuckerman could testify as to the lack of any change in the ladder from the time of purchase. (ECF 94).

The Court held a hearing on these motions on December 11, 2014. The District Court denied Appellants’ Motion to Reconsider and granted Appellees’ Motion for Summary Judgment. (JA 408-11). As to the Motion to Reconsider, the Court restated its prior holding that Dr. Kelkar could not “rule out the fact that the cracks occurred as a result of the fall.” (JA 408 Ins. 18-21). The Court also found that the use of the word “assume” by Appellees’ counsel in the question to Dr. Kelkar rendered his opinion insufficient. (JA 408-10). The Court finally noted:

[I]f he’d have somewhere said that, after considering all of the facts, I feel that the cracks most probably occurred during the manufacture,

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<sup>7</sup> See *Smith v. Ford Motor Co.*, 215 F.3d 713, 721 (7th Cir. 2000) (“[I]t would be appropriate for a district court to apply Rule 702’s requirements to individual pieces of proposed testimony, so that if the district court found a particular part of that testimony irrelevant or unreliable, it could exclude that portion of the testimony without striking the proposed evidence in its entirety.”).

and that word assume weren't in there, then it would be a different matter. I think you could get by the cracks from the fall, possible cracks from the fall.

(JA 409 lns. 12-17).<sup>8</sup> The Court granted the Motion for Summary Judgment because, absent Dr. Kelkar's testimony, the Zuckermans had insufficient "evidence of a manufacturing defect." (JA 411 lns. 6-10).

On December 12, 2014, the District Court issued a written, one-page Order on its decision at the hearing. (JA 414). The Order states it is based on "the reasons stated on the record" at the hearing." (JA 414).

### **SUMMARY OF THE ARGUMENT**

The District Court erred in excluding Dr. Kelkar's expert testimony because he is unable to definitively rule out the accident as a cause of the microcracks or definitively date the age of the microcracks. The standard for reliability and admissibility of expert testimony under Rule 702 and *Daubert*, does not require that an expert rule out other causes with certainty. Rather, an expert must consider alternative causes and, based on experience and scientific principles and testing, eliminate alternatives before arriving at an opinion as to the most likely cause. The

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<sup>8</sup> As explained below in the Argument section, Dr. Kelkar did definitively state in his deposition after the "assume" question from Appellees' counsel that he was "fully confident on my statement and my theory" that the microcracks formed during manufacture and propagated over time to cause the ladder failure. (JA 202 lns. 4-17).

factors relied on by the District Court go to the weight of Dr. Kelkar's testimony rather than its admissibility.

The District Court also erred in ruling that, absent Dr. Kelkar's testimony, Appellants had insufficient evidence of a manufacturing defect. There is no dispute that the microcracks exist. The issue Appellees contest is how and when the microcracks formed. The parties' competing theories for the time of formation are at the time of (1) manufacture or (2) the accident. Appellants can call Dr. Kimbro to testify as to the destructive testing process and the presence of microcracks seen under microscopic examination. Mr. Zuckerman can (and did) testify that the ladder, at the time of the accident, was in essentially the same condition as when he purchased it. He can further testify that he did not fall on the ladder and, therefore, caused no impact damage. This testimony, taken together, is sufficient to present to a jury. It is not, as Appellees argued below, *res ipsa loquitor* because the microcracks—a defect not intended to exist in the product—undeniably exist. The doctrine of *res ipsa loquitor* applies only to a negligence action, and not to Appellants' claims for strict liability and breach of warranty. Further, a negligence action may be proven by circumstantial evidence.

Even if this Court affirms the District Court's decision to exclude Dr. Kelkar's testimony, it should reverse the District Court's decision to grant Appellees summary judgment.

## **ARGUMENT**

### **I. THE TRIAL COURT ERRED IN EXCLUDING DR. KELKAR'S EXPERT TESTIMONY**

#### **A. Standard of Review**

The Court “review[s] a decision to admit or exclude expert testimony for abuse of discretion.” *Simo v. Mitsubishi Motors N.A., Inc.*, 245 Fed. Appx. 295, 299 (4th Cir. 2007). “A district court abuses its discretion if its conclusion is guided by erroneous legal principles or rests upon a clearly erroneous factual finding.” *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 261 (4th Cir. 1999) (internal citation omitted). “[E]ven if a district court applies the correct legal principles to adequately supported facts, the discretion of the trial court is not boundless and subject to automatic affirmance.” *Id.* at 261.

This court is obligated to review the record and reasons offered by the district court and to reverse if the court has a definite and firm conviction that the court below committed a clear error of judgment in the conclusion it reached upon a weighing of the relevant factors.

*Id.* (internal quotation marks omitted).

#### **B. Rule 702 and the *Daubert* Factors**

The admissibility of expert testimony is governed by Federal Rule of Evidence 702, which provides:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:



- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702. In *Daubert*, the Supreme Court listed five non-exhaustive factors that a court may use in assessing the reliability of expert testimony:

- (1) whether the particular scientific theory “can be (and has been) tested”; (2) whether the theory “has been subjected to peer review and publication”; (3) the “known or potential rate of error”; (4) the “existence and maintenance of standards controlling the technique's operation”; and (5) whether the technique has achieved “general acceptance” in the relevant scientific or expert community.

*United States v. Crisp*, 324 F.3d 261, 265-66 (4th Cir. 2003) (quoting *Daubert*, 509 U.S. at 593-94). “[A] trial court should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony.” *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999). “[T]he proponent of expert testimony does not have the burden to prove anything, but must come forward with evidence from which the court can determine that the proffered testimony is properly admissible.” *Pugh*, 361 Fed. Appx. at 452-53 (internal quotation marks omitted).

Neither the District Court nor Appellees disputed Dr. Kelkar's qualifications or that his knowledge would help the jury to understand the evidence or determine

a fact at issue. Rather, the District Court found Dr. Kelkar's opinion unreliable because he could not definitively rule out the accident as a cause of the microcracks or date the age of the microcracks, and because he answered "Yes" to a question posed by Appellees' counsel with the word "assume" in it. As explained below, these arguments to go the weight of the expert testimony rather than its admissibility. By requiring Dr. Kelkar to definitively disprove an alternate cause and prove the age of the microcracks, the District Court applied an incorrect standard of reliability.

**C. The District Court Erred in Requiring Dr. Kelkar to Reach a Conclusion with Certainty Regarding the Formation of the Microcracks at the Time of Manufacture.**

The District Court erred in excluding Dr. Kelkar's testimony because he could not definitively exclude the accident as a cause of the microcracks. The inability to definitively exclude the accident as a cause does not make his opinion that the manufacturing process is the most likely cause unreliable.

The standard of expert testimony admissibility does not require Dr. Kelkar to prove his opinions with certainty. "[P]laintiffs do not have to prove their case twice-- they do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable." *Maryland Cas. Co. v. Therm-O-Disc*, 137 F.3d 780, 783 (4th Cir. 1998) (affirming

the admission of an electrical engineer's defect testimony where he had "over twenty-five years experience in analyzing switch failures . . . established that his opinion was based on his examination of the conditions inside the disputed switch and the application of principles of electrical engineering to those conditions"). The requirement is that Dr. Kelkar's opinion is reliable. In this case, Dr. Kelkar considered numerous alternative causes of the microcracks and determined each alternative a less likely cause than the creation of the cracks during the manufacture process.

An expert opinion is reliable when "it is supported by adequate validation to render it trustworthy." *Westberry*, 178 F.3d at 260.

[T]he court need not determine that the expert testimony a litigant seeks to offer into evidence is irrefutable or certainly correct. As with all other admissible evidence, expert testimony is subject to being tested by vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof.

*Id.* at 261 (internal citation and quotation marks omitted). In *Westberry*, the plaintiff brought suit against a manufacturer for its failure to warn of the danger of exposure to talcum powder used on its product. *Id.* at 259-60. After a jury verdict in the plaintiff's favor, the defendant appealed the district court's decision to admit expert testimony of a doctor regarding causation. *Id.* at 260. The defendant argued the doctor's "differential diagnosis was unreliable because he failed to 'rule out' all

potential causes [of plaintiff's injuries] other than talc.” *Id.* at 265. This Court rejected that argument.

The alternative causes suggested by a defendant affect the weight that the jury should give the expert's testimony and not the admissibility of that testimony, unless the expert can offer no explanation for why she has concluded an alternative cause offered by the opposing party was not the sole cause.

*Id.* at 265 (internal quotation marks and citation omitted). This reasoning applies to the Zuckermans' case.

As explained above, Dr. Kelkar considered every alternative cause suggested by Appellees as to the formation of the microcracks and provided an explanation for why he discounted each alternative cause as the sole cause of the microcracks. Appellees simply take issue with his bases for ruling out those causes, arguing he should have conducted more tests to more definitively rule out alternative causes. (ECF 70 p. 4). However, as in *Westberry*, this argument goes to the weight of the expert's testimony and not to its reliability or admissibility. Dr. Kelkar's testimony is not unreliable or inadmissible because he cannot definitively rule out every other cause. *See Lauzon v. Senco Prods.*, 270 F.3d 681, 693 (8th Cir. 2001) (“[A]n ‘expert’s causation conclusion should not be excluded because he or she has failed to rule out every possible alternative cause.’” (quoting *Westberry*, 178

F.3d at 265));<sup>9</sup> *Bitler v. A.O. Smith Corp.*, 400 F.3d 1227, 1236 n.2 (10th Cir. 2004) (“Nowhere does Rule 702 or *Daubert* require a finding that an expert’s proffered testimony reach absolute certainty with regard to the likely truth of a conclusion.”).

Dr. Kelkar conducted a firsthand examination of the ladder and found visible cracks at the rivets. (JA 33, 38). He also conducted destructive testing and examined the rivet holes using a scanning electron microscope. (JA 35, 176). Using further measurements, inspections, and engineering knowledge, Dr. Kelkar discounted weight, corrosion, design flaw, flawed materials, material hardness, and impact damage as causes of the microcracks. (JA 28-55, 155-60, 179, 187-90). After objectively discounting these alternative causes with scientific, tested, and experiential explanations, Dr. Kelkar determined the most likely cause of the microcracks is the punching of rivet holes during the manufacturing process. (JA 35-37, 202).

The District Court erred in requiring Dr. Kelkar to prove with certainty that the microcracks formed at the time of manufacture as a prerequisite to admissibility of his testimony. As this Court held in *Pugh*,

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<sup>9</sup> In *Lauzon*, the Eighth Circuit, relying on *Westberry*, overruled the district court’s finding that the plaintiff’s expert “was unable to rule out other accident theories, except for ruling out a manufacturing defect.” 270 F.3d at 693-94. It held, “[e]ven a specious interpretation of [the expert]’s testimony, which would enable other possible theories of the event to exist such as an accident, does not preclude his testimony under this [exclusion of possible causes] factor.” *Id.* at 694.

Although reliability of an expert's principles and methods, as well as the application of the facts to such methods, must be examined by the district court, the court need not determine that the proffered expert testimony is irrefutable or certainly correct, since, like all forms of testimony, expert testimony is subject to testing by vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof.

361 Fed. Appx. at 452 (internal quotation marks omitted). Dr. Kelkar's opinion is reliable and subject to cross-examination by Appellees at trial. Therefore, the District Court erred in excluding Dr. Kelkar's testimony.

**D. The District Court Erred in Focusing on Dr. Kelkar's Conclusions Rather than His Methodology.**

The District Court and Appellees focused on Dr. Kelkar's inability to definitively rule out the accident impact as a cause of the microcracks but did not challenge the principle that punching holes and inserting rivets in an aluminum part weakens the metal and can create cracks that propagate. (JA 34, 38). "The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." *Daubert*, 509 U.S. at 595. "The soundness of the factual underpinnings of the expert's analysis and the correctness of the expert's conclusions based on that analysis are factual matters to be determined by the trier of fact, or, where appropriate, on summary judgment." *Smith v. Ford Motor Co.*, 215 F.3d 713, 718 (7th Cir. 2000).

The question of whether the expert is credible or whether his or her theories are correct given the circumstances of a particular case is a factual one that is left for the jury to determine after opposing counsel

has been provided the opportunity to cross-examine the expert regarding his conclusions and the facts on which they are based.

*Id.* at 719, 721 n.2 (reversing the district court’s exclusion of plaintiffs’ experts where “neither expert was able to determine which type of defect was the actual cause of the accident, [but] both experts testified that in their opinion some type of defect did exist”).

The District Court is limited to determining whether the proffered expert used reliable methodology. The accuracy of an expert’s ultimate opinion or conclusion is a question for the jury. The District Court erred by focusing on whether Dr. Kelkar’s conclusion as to the cause of the microcracks is correct rather than whether the methodology he used to reach that conclusion is reliable. There is no evidence to discount the principle that microcracks could form during the manufacturing process when rivet holes are punched in the metal. *See Pugh*, 361 Fed. Appx. at 452 n.2 (describing this principle “is a widely accepted phenomenon”).

There is also no basis to discredit the particular measurements, tests, and calculations used by Dr. Kelkar to reach his conclusion. Appellees’ own expert did not criticize Dr. Kelkar’s methodology but only his conclusions. Appellees’ expert testified:

I certainly have many disagreements with [Dr. Kelkar] and his ***conclusions***.

...

I know that a lot of things he *concluded* were wrong. Now, *why that's so, I don't know*.

(JA 233 lns. 4-12) (emphasis added).

The District Court erred in focusing on Dr. Kelkar's conclusion as to the most likely cause of the microcracks rather than the reliability of the methodology he used to reach a conclusion.

**E. The District Court Erred in Viewing Appellees' Counsel's "Assume" Question to Dr. Kelkar in Isolation.**

In denying Appellants' Motion to Reconsider the decision to exclude Dr. Kelkar's expert testimony, the District Court relied in part on one question and answer from Dr. Kelkar's deposition. During Dr. Kelkar's deposition, counsel for Appellees asked Dr. Kelkar: "[Y]ou assume that those rivet hole – that those microcracks would have occurred at the time of manufacture. Is that it in a nutshell? Do I understand your – your opinion?" (JA 119 lns. 21-25). Dr. Kelkar answered "Yes." (JA 120 ln. 1). The District Court held:

[A]ssume is a word that just bothers me more than anything else. So he doesn't have any facts or data to support his opinion, because all he's got is an assumption. And 702 requires that he have facts or data.

(JA 409 lns. 18-21). This assessment is incorrect for several reasons.

First, there are numerous facts and data to support Dr. Kelkar's opinion that the microcracks formed during the manufacturing process. Microcracks exist at three rivet holes on the ladder, including the rivet hole at the location of the



buckling. (JA 35-52). Mr. Zuckerman testified the ladder suffered no abuse and he did not fall on it on the day of the accident. (JA 104-05, 107, 116). Dr. Kelkar cited engineering textbooks in the Failure Analysis for the propositions that (1) “Cracks in aluminum initiate at a point of high stress concentration” and (2) “A hole or notch acts as a stress riser in any structures.” (JA 34). This Court previously found Dr. Kelkar “knows” “based on his years of experience”

that punching a hole in any metal in order to install a rivet weakens the metal and that crack propagation from rivets in metal is a widely accepted phenomenon.

*Pugh*, 361 Fed. Appx. at 452 n.2. These examples, in addition to the detailed description of the investigation in the Statement of Facts section above, demonstrates that Dr. Kelkar’s opinion as to the formation of the microcracks during the manufacturing process is supported by reliable facts and data.

Second, the District Court’s focus on this one question and answer ignores the remaining one hundred plus pages of Dr. Kelkar’s deposition testimony as well as the Failure Analysis report and his qualifications. When the question and answer are considered in context, there is no basis for excluding Dr. Kelkar’s testimony because Appellees’ counsel used the word “assume.” Dr. Kelkar testified the only other things that could cause microcracks like those found in Mr. Zuckerman’s ladder are corrosion and an inherent defect in the alloy. (JA 134-35). Dr. Kelkar ruled out both of those possibilities in his deposition testimony. (JA 34,

186). Therefore, the only conclusion left is that the microcracks existed at the time of manufacture. It is not an assumption, but a conclusion reached after destructive testing, microscopic scanning, application of scientific principles, and Dr. Kelkar's decades of engineering and materials failure experience. The admissibility of Dr. Kelkar's testimony, and in this instance Appellants' entire case, should not turn on the use of the word "assume" in one deposition question.

Third, even taking the question and answer at face value, that an expert may make an assumption to reach an opinion does not render that opinion unreliable. "Of course, it would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably, there are no certainties in science." *Daubert*, 509 U.S. at 590.

The District Court erred in relying on one question and answer from Dr. Kelkar's deposition to exclude his testimony, especially when he later affirmed his opinion. (JA 202 lns 4-17).

## **II. THE DISTRICT COURT ERRED IN GRANTING SUMMARY JUDGMENT FOR APPELLEES**

### **A. Standard of Review**

This Court "review[s] an award of summary judgment de novo." *Adams v. Trs. of the Univ. of N. Carolina-Wilmington*, 640 F.3d 550, 556 (4th Cir. 2011). Summary judgment is not appropriate if the nonmoving party shows "that a fact . . . is genuinely disputed" by

citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, . . . interrogatory answers, or other materials.

Fed. R. Civ. P. 56(c). The Court “construe[s] the evidence in the light most favorable to . . . the party opposing the . . . summary judgment motion, and draw[s] all reasonable inferences in his favor.” *Adams*, 640 F.3d at 556.

If this Court affirms the District Court’s decision to exclude Dr. Kelkar’s testimony, it may still reverse the District Court’s decision to grant summary judgment to Appellees because the Zuckermans have adequate evidence of each element of the products liability claims without Dr. Kelkar’s testimony.

**B. There is Evidence to Support the Zuckermans’ Product Liability Causes of Action.**

The Zuckermans alleged product liability causes of action for negligence, strict liability, breach of the implied warranty of merchantability, and breach of the implied warranty of fitness for a particular purpose.<sup>10</sup> (JA 14-24).

In a product liability action the plaintiff must establish three things, regardless of the theory on which he seeks recovery: (1) that he was injured by the product; (2) that the product, at the time of the accident, was in essentially the same condition as when it left the hands of the defendant; and (3) that the injury occurred because the product was in a defective condition unreasonably dangerous to the user.

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<sup>10</sup> Mrs. Zuckerman alleged a loss of consortium action. However, the sufficiency of the evidence to support that claim is not at issue on appeal because the District Court made no ruling regarding loss of consortium.

*Madden v. Cox*, 284 S.C. 574, 579, 328 S.E.2d 108, 112 (Ct. App. 1985). There is no dispute that Mr. Zuckerman was injured by the ladder. Therefore, Appellants address only the second and third elements.

**C. On November 5, 2011, the Ladder was in Essentially the Same Condition as When it Left Appellees' Hands.**

The Zuckermans can present sufficient evidence that the ladder, at the time of the accident, was in essentially the same condition as when it left Appellees' hands. Mr. Zuckerman can testify about the history of the ladder from the time he purchased it at Wal-Mart. He stored the ladder in his garage and used it approximately eleven times a year for its intended purpose—to reach light bulbs and a smoke detector. (JA 100, 212). The ladder suffered no abuse. (JA 171 Ins. 10-13). Mr. Zuckerman experienced no problems with the ladder prior to the incident at issue. (JA 100). There is no contrary evidence to suggest the ladder was altered or abused in any way prior to the accident. Therefore, viewing the evidence in a light most favorable to the Zuckermans, a jury could conclude the ladder, on November 5, 2011, was in the same condition as when it left Appellees' hands.

Appellees will likely argue that Appellants cannot directly and definitively prove when the microcracks came into existence. This is incorrect and misstates the type of proof a plaintiff may use in a product liability action. As stated above, a plaintiff is required to prove the product, at the time of the accident, was in

essentially the same condition as when it left the defendants' hands, not that the defect existed at the time of manufacture. Further, a product liability action may be proven by circumstantial evidence. *See Watson v. Ford Motor Co.*, 389 S.C. 434, 461, 699 S.E.2d 169, 183 (2010) (stating a plaintiff in a product liability action "could properly prove that the [product] was defective and unreasonably dangerous using circumstantial evidence").

The existence of microcracks under the rivet heads and above the location where buckling occurred tends to prove the cracks pre-existed the accident and existed at the time of purchase. (JA 38). Mr. Zuckerman observed no defects in the ladder at the time of purchase, stored it in his garage, and said the ladder suffered no damage or abuse prior to the accident. Further, Dr. Kimbro can testify to the established engineering principle that punching a hole in metal to install a rivet weakens the metal and could result in crack propagation.<sup>11</sup> Rule 702 "recognizes that an expert on the stand may give a dissertation or exposition of scientific or other principles relevant to the case, leaving the trier of fact to apply them to the facts." Fed. R. Evid. 702 advisory committee's notes. "[I]t seems wise . . . to encourage the use of expert testimony in non-opinion form when counsel

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<sup>11</sup> In addition to having a Ph.D. and Master of Science Degree in mechanical engineering, Dr. Kimbro co-authored a published article on materials failure analysis, presented at numerous international engineering conferences on topics including composite materials, investigation of impact behavior of composite laminates, and energy absorption of composites. (JA 64, 66-67, 78-79).

believes the trier can itself draw the requisite inference.” *Id.* This is sufficient evidence for the jury to infer both that the ladder was in essentially the same condition as when it left Appellees’ hands and, if the Court finds necessary, that the microcracks formed at the time of manufacture.

**D. The Ladder was in a Defective Condition Unreasonably Dangerous to Mr. Zuckerman.**

Viewing the evidence in a light most favorable to Appellants, the ladder was in a defective condition unreasonably dangerous to Mr. Zuckerman because it contained microcracks around the rivet holes. To determine whether a product was unreasonably dangerous as a result of a manufacturing defect, the court uses the consumer expectations test. *Branham v. Ford Motor Co.*, 390 S.C. 203, 222, 701 S.E.2d 5, 15 (2010). Under the consumer expectations test, the factfinder decides whether a product is defective by evaluating “whether the product is unreasonably dangerous to the consumer or user given the conditions and circumstances that foreseeably attend use of the product.” *Id.* at 218, 701 S.E.2d at 13. A product defect may be proven by circumstantial evidence. Restatement (Third) of Torts: Products Liability, § 3 (1998).

A ladder with microcracks around the rivet holes is unreasonably dangerous to the user given that it is foreseeable a user will climb the ladder, putting weight on the steps connected by rivet holes to the side rails. Dr. Kimbro can testify as to

the existence of microcracks at the step where the ladder failed and above that step, and about the destructive testing conducted to find the cracks.

Appellees claim that, without Dr. Kelkar's testimony, Appellants' evidence amounts to a *res ipsa loquitor* argument. This is incorrect. First, the *res ipsa* doctrine applies only to a negligence claim, not to Appellants' claims for strict liability and breach of warranty. *See Watson*, 389 S.C. at 453 n.7, 699 S.E.2d at 179 n.7 (“*Res ipsa loquitur* is a rebuttable presumption that the defendant was **negligent** where an accident is one which ordinarily does not occur in the absence of **negligence**.” (emphasis added)). Second, Appellants have sufficient proof beyond the ladder's failure. It is undisputed that microcracks exist at the location of the ladder's failure and at a location above it. (JA 28-55). This is evidence of a specific defect in the ladder. It is undisputed that some of the microcracks could be found only underneath the rivet heads. (JA 28-55). Further, Appellants may admit testimony from Mr. Zuckerman that the ladder remained in essentially the same condition as when he purchased it and from Dr. Kimbro that it is an accepted engineering principle that punching a hole in metal weakens it. This evidence goes far beyond mere failure and negates any argument that Appellants are asking for an inference to be drawn from only the ladder's failure.

This evidence is sufficient to survive summary judgment as to strict liability. The additional elements for breach of warranty and negligence are discussed below.

**E. Breach of Implied Warranty of Merchantability and Fitness for a Particular Purpose**

The implied warranties of merchantability and fitness for a particular purpose merge in this case and, therefore, the Zuckermans may proceed on either theory.

[W]here the particular purpose for which a product is purchased is also the ordinary or intended purpose of the product, the warranties of merchantability and of fitness for a particular purpose merge and are cumulative, such that a plaintiff may proceed upon either theory.

*Soaper v. Hope Indus.*, 309 S.C. 438, 440, 424 S.E.2d 493, 495 (1992). The implied warranty of merchantability is “a warranty that the goods shall be merchantable [and] is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind.” S.C. Code Ann. § 36-2-314(1) (2003). Section 36-2-314 provides, in relevant part,

Goods to be merchantable must be at least such as . . . are fit for the ordinary purposes for which such goods are used; and run, within the variations permitted by the agreement, of even kind, quality and quantity within each unit and among all units involved . . . .

§ 36-2-314(2)(c)-(d).

In this case, there is evidence of a breach of the implied warranty of merchantability. Appellees warranted the ladder was fit for its ordinary purpose of



a person within the load capacity climbing on it to reach something such as a lightbulb or smoke detector. The presence of microcracks, which make the ladder susceptible to failure over time and not fit for its ordinary purpose, is evidence of a breach of the warranty.

#### **F. Negligence**

In addition to the three elements of a product liability claim listed above, a plaintiff in a negligence claim must also show “the defendant (seller or manufacturer) failed to exercise due care in some respect.” *Bragg v. Hi-Ranger, Inc.*, 319 S.C. 531, 539, 462 S.E.2d 321, 326 (Ct. App. 1995). “[A] [product liability] negligence claim may be established, as here, by circumstantial evidence showing that, through the exercise of reasonable diligence, [the defendants] should have known of the” defect. *5 Star, Inc. v. Ford Motor Co.*, 408 S.C. 362, 370, 759 S.E.2d 139, 143-44 (2014) (finding the alleged defect “grounded in basic science”).<sup>12</sup>

In addition to the testimony described above, the Zuckermans can present evidence that the design for the ladder model at issue does not include microcracks. Therefore, the jury may infer that the presence of microcracks underneath the rivet heads indicates a failure to exercise due care in the manufacture of the ladder. Dr. Kimbro can testify it is basic science that punching

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<sup>12</sup> “A manufacturer may not avoid negligence liability by turning a blind-eye to the obvious.” *Id.* at 371, 759 S.E.2d at 144.

a hole in metal weakens it and microcracks would reduce the load capacity of the ladder. Therefore, there is evidence from which the jury could infer Appellees failed to exercise due care.

### **CONCLUSION**

The District Court erred in excluding Dr. Kelkar's testimony by requiring him to definitively rule out alternative causes of the microcracks. This ruling is at odds with the expert testimony reliability standard under Rule 702 and *Daubert*. Dr. Kelkar's methods of investigation and testing in this case are reliable and appropriately took into consideration alternative causes of the microcracks. For this reason alone, the Court should reverse the rulings of the District Court in their entirety. However, if this Court affirms the District Court's ruling to exclude Dr. Kelkar's testimony, it should reverse the decision to grant summary judgment because Appellants can present sufficient evidence of the product liability causes of action.

For these reasons, the District Court orders excluding Dr. Kelkar's testimony and granting summary judgment to Appellees should be reversed.

Respectfully submitted,

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March 3, 2015

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**UNITED STATES COURT OF APPEALS**  
**FOR THE FOURTH CIRCUIT**

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I hereby certify that on March 3, 2015, I electronically filed the foregoing with the Clerk of Court using the CM/ECF System, which will send notice of such filing to the following registered CM/ECF users:

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